

ABRASION/EROSION IN STILLING BASINS

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INTRODUCTION

Many stilling basins have experienced damage caused by rock, gravel, and sand brought into the basin by back flow over the stilling basin end sill. Normal operation of a hydraulic jump energy dissipation basin can cause a reverse flow eddy over the basin end sill and lower apron as shown in figure 1. This counter-rotating eddy is driven by a high velocity jet rising off the basin floor near the end of the basin. Riprap placed on the apron downstream of the basin end sill is typically designed to be stable under this condition. However, small material can be transported into the basin and trapped where turbulent flow continually moves the material about the surface, eroding the concrete. The cost for these repairs, in terms of time, effort and money, can be significant. If a means to reduce the reverse flow can be found, large savings can be obtained. One possible solution that is currently being studied at the Bureau of Reclamation's Water Resources Research Laboratory (WRRL) is to install flow deflectors in the basin to improve inter-basin flow conditions and minimize upstream velocities over the basin end sill (figure 2).

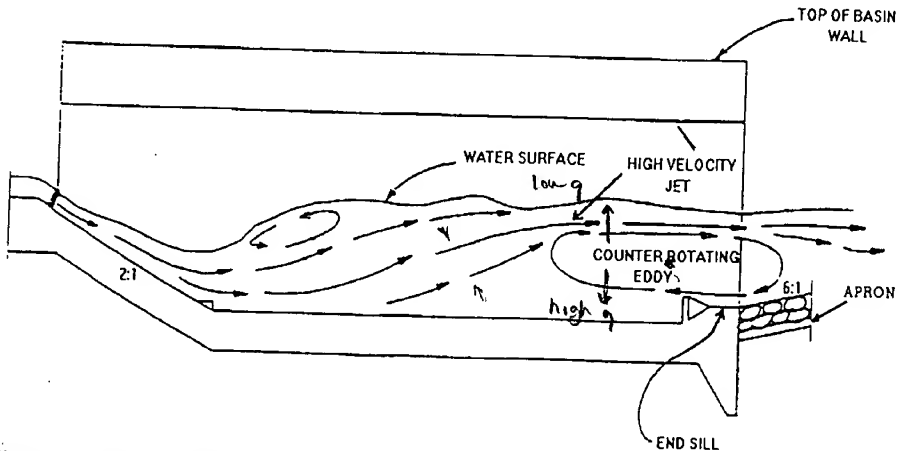


Figure 1. Counter-rotating flow eddy over basin end sill and lower apron.